



**Microtest**  
微 测 检 测

# Test Report

**Report No.:** MTi210820013-07E1

**Date of issue:** Apr. 28, 2022

**Applicant:** Shenzhen Jiayz photo industrial., Ltd

**Product name:** Microphone

**Model(s):** BY-X1 RX, BY-X3 RX, BY-X1, BY-X3

**FCC ID:** 2ARN3-X1RX

Shenzhen Microtest Co., Ltd.  
<http://www.mtitest.com>



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## Table of Contents


<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	FEATURE OF EQUIPMENT UNDER TEST (EUT).....	5
1.2	OPERATION CHANNEL LIST .....	5
1.3	TEST FREQUENCY CHANNEL.....	5
1.4	EUT OPERATION MODE .....	5
1.5	ANCILLARY EQUIPMENT LIST.....	6
<b>2</b>	<b>SUMMARY OF TEST RESULT .....</b>	<b>6</b>
<b>3</b>	<b>TEST FACILITIES AND ACCREDITATIONS .....</b>	<b>7</b>
3.1	TEST LABORATORY.....	7
3.2	ENVIRONMENTAL CONDITIONS .....	7
3.3	MEASUREMENT UNCERTAINTY.....	7
3.4	TEST SOFTWARE .....	7
<b>4</b>	<b>LIST OF TEST EQUIPMENT .....</b>	<b>8</b>
<b>5</b>	<b>TEST RESULT .....</b>	<b>9</b>
5.1	ANTENNA REQUIREMENT .....	9
5.1.1	<i>Standard requirement</i> .....	9
5.1.2	<i>EUT Antenna</i> .....	9
5.2	AC POWER LINE CONDUCTED EMISSION .....	10
5.2.1	<i>Limits</i> .....	10
5.2.2	<i>Test setup</i> .....	10
5.2.3	<i>Test procedure</i> .....	11
5.2.4	<i>Test results</i> .....	11
5.3	RADIATED SPURIOUS EMISSION.....	14
5.3.1	<i>Limit</i> .....	14
5.3.2	<i>Test method</i> .....	14
5.3.3	<i>Test Result</i> .....	15
5.3.4	<i>Band edge-Field strength of fundamental</i> .....	20
5.3.5	<i>Band edge-radiated</i> .....	21
5.4	20DB AND 99% BANDWIDTH .....	22
5.4.1	<i>Limits</i> .....	22
5.4.2	<i>Test method</i> .....	22
5.4.3	<i>Test result</i> .....	23
	<b>PHOTOGRAPHS OF THE TEST SETUP.....</b>	<b>25</b>
	<b>PHOTOGRAPHS OF THE EUT .....</b>	<b>26</b>



<b>TEST RESULT CERTIFICATION</b>	
Applicant's name .....	Shenzhen Jiayz photo industrial., Ltd
Address .....	A16 Building, Intelligent Terminal Industrial Park of Silicon Valley Power, Guanlan, Longhua District, Shenzhen, China
Manufacturer's Name .....	Shenzhen Jiayz photo industrial., Ltd
Address .....	A16 Building, Intelligent Terminal Industrial Park of Silicon Valley Power, Guanlan, Longhua District, Shenzhen, China
<b>Product description</b>	
Product name .....	Microphone
Trademark .....	BOYA
Model Name .....	BY-X1 RX
Serial Model .....	BY-X3 RX, BY-X1, BY-X3
Standards .....	FCC Part 15.249
Test procedure.....	ANSI C63.10-2013
<b>Date of Test</b>	
Date (s) of performance of tests..... :	2021-11-16 ~2022-04-28
Test Result..... :	Pass
This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.	

**Testing Engineer** :   
(Danny Xu)

**Technical Manager** :   
(Leon Chen)

**Authorized Signatory** :   
(Tom Xue)

## 1 General description

### 1.1 Feature of equipment under test (EUT)

Equipment:	Microphone
Model Name:	BY-X1 RX
Serial Model:	BY-X3 RX, BY-X1, BY-X3
Model Difference:	All the models are the same circuit and module, except the model name.
Operation Frequency:	2405.377 - 2475.521 MHz
Modulation Type:	GFSK
Antenna Type:	Ceramic antenna
Antenna Gain:	4.97dBi
Max. Field Strength:	78.71dBuV/m
Power Source:	DC 5V/1A or Power by battery
Battery:	DC 3.7V 900mAh
Hardware version:	V1.0
Software version:	SX1_20210831_CS=0X2D14

### 1.2 Operation channel list

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2405.377	10	2425.857	19	2944.801	33	2473.473
2	2409.473	11	2927.905	20	2446.849	34	2475.521
3	2411.521	12	2430.465	21	2948.897	/	/
4	2413.569	13	2432.513	22	2450.945	/	/
5	2415.617	14	2934.561	23	2452.993	/	/
6	2417.665	15	2436.609	24	2455.091	/	/
7	2419.713	16	2438.657	25	2457.089	/	/
8	2421.761	17	2440.705	26	2459.137	/	/
9	2423.809	18	2442.753	27	2461.185	/	/

### 1.3 Test Frequency Channel

Channel	Frequency(MHz)
Low	2405.377
Middle	2438.657
High	2475.521

### 1.4 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation



followed the test requirement.

**1.5 Ancillary equipment list**

Equipment	Model	S/N	Manufacturer
Adapter	HW-090200CH0	/	Huizhou BYD Electronics Co., Ltd.

**2 Summary of Test Result**

Test procedures according to the technical standards:

Item	FCC Part No.	Description of Test	Result
1	FCC Part15.203	Antenna Requirement	Pass
2	FCC Part15.207	AC power line conducted emission	Pass
5	FCC Part15.249(d)	Radiated spurious emission	Pass
4	FCC Part 15.215	20dB and 99% Bandwidth	Pass

### 3 Test Facilities and Accreditations

#### 3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao' an District, Shenzhen, Guangdong, China.
FCC Registration No.	448573

#### 3.2 Environmental conditions

Temperature:	15°C~35°C
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

#### 3.3 Measurement uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %

RF frequency	$1 \times 10^{-7}$
RF power, conducted	$\pm 1$ dB
Conducted emission(150kHz~30MHz)	$\pm 2.5$ dB
Radiated emission(9KHz~30MHz)	$\pm 4.0$ dB
Radiated emission(30MHz~1GHz)	$\pm 4.2$ dB
Radiated emission (above 1GHz)	$\pm 4.3$ dB
Temperature	$\pm 1$ degree
Humidity	$\pm 5$ %

#### 3.4 Test software

Software Name	Manufacturer	Model	Version
Bluetooth and WiFi Test System	Shenzhen JS tonscond co.,ltd	JS1120-3	2.5.77.0418

**4 List of test equipment**

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E043	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2021/06/02	2022/06/01
MTI-E044	TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-1338	2021/05/30	2023/05/29
MTI-E047	Amplifier	Hewlett-Packard	8447F	3113A06150	2021/06/02	2022/06/01
MTI-E089	ESG Vector Signal Generator	Agilent	N5182A	MY49060455	2021/06/02	2022/06/01
MTI-E058	ESG Series Analog Signal Generator	Agilent	E4421B	GB40051240	2021/06/02	2022/06/01
MTI-E062	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2021/06/02	2022/06/01
MTI-E066	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2021/06/02	2022/06/01
MTI-E078	Synthesized Sweeper	Agilent	83752A	3610A01957	2021/06/02	2022/06/01
MTI-E079	DC Power Supply	Agilent	E3632A	MY40027695	2021/06/02	2022/06/01
MTI-E045	Double Ridged Broadband Horn Antenna	schwarzbeck	BBHA 9120D	9120D-2278	2021/05/30	2023/05/29
MTI-E021	EMI Test Receiver	Rohde&schwarz	ESCS30	100210	2021/06/02	2022/06/01
MTI-E022	Pulse Limiter	Schwarzbeck	VSTD 9561-F	00679	2021/06/02	2022/06/01
MTI-E023	Artificial mains network	Schwarzbeck	NSLK 8127	NSLK 8127 #841	2021/06/02	2022/06/01
MTI-E046	Active Loop Antenna	Schwarzbeck	FMZB 1519B	00044	2021/05/30	2023/05/29
MTI-E048	Amplifier	Agilent	8449B	3008A02400	2021/06/02	2022/06/01
MTI-E072	Thermometer Clock Humidity Monitor	-	HTC-1	/	2021/06/02	2022/06/01

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).



## **5 Test Result**

### **5.1 Antenna requirement**

#### **5.1.1 Standard requirement**

FCC PART 15.203;

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

#### **5.1.2 EUT Antenna**

The antenna is a Ceramic antenna, which was permanently affixed to the device and un-replaced, complies with 15.203. In addition, the maximum antenna gain is 4.97dBi.

## 5.2 AC power line conducted emission

### 5.2.1 Limits

FCC §15.207;

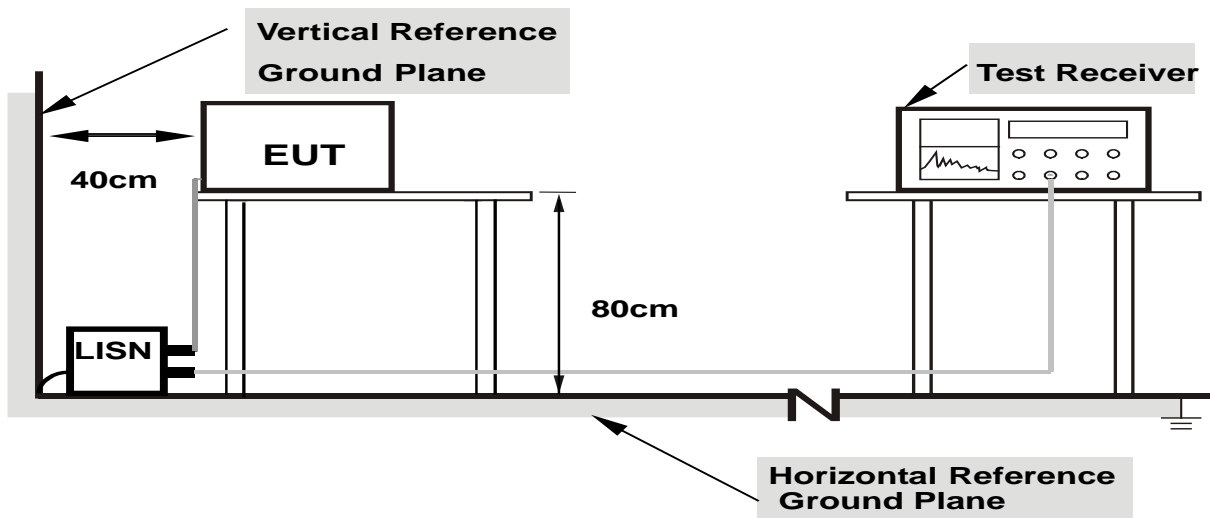
For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

Frequency (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 <sup>note2</sup>	56 - 46 <sup>note2</sup>
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note1: The tighter limit applies at the band edges.

Note2: The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

### 5.2.2 Test setup



**Note: 1.Support units were connected to second LISN.**

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

### 5.2.3 Test procedure

a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b. The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment's powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

d. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

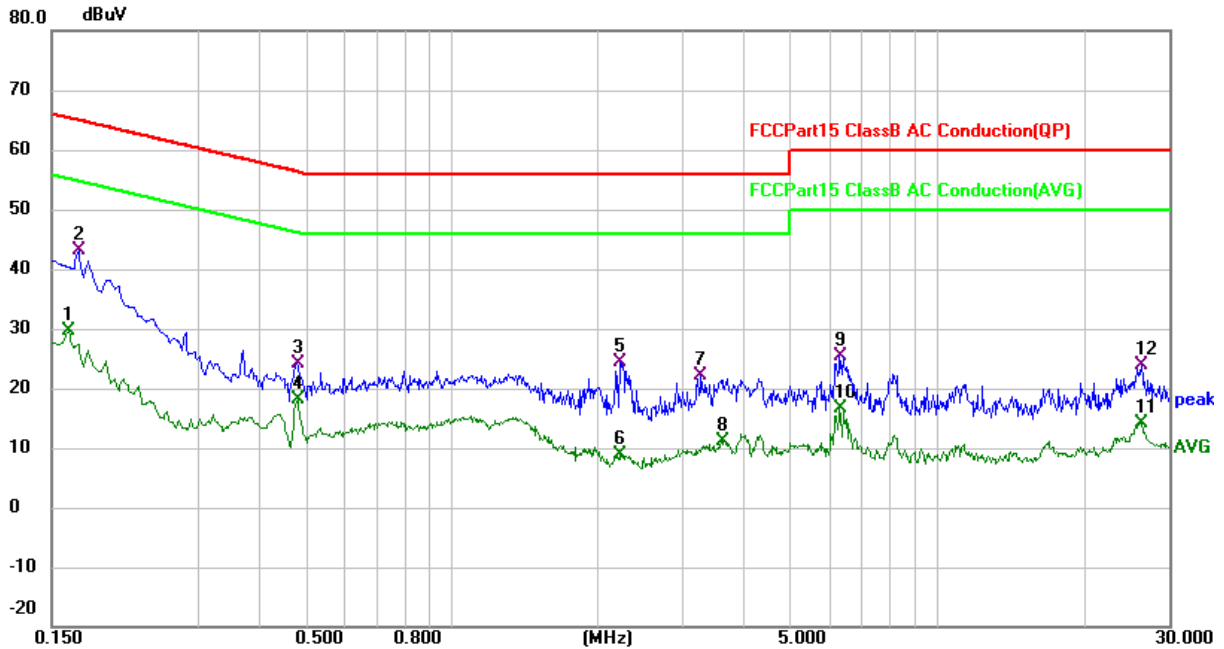
f. LISN at least 80 cm from nearest part of EUT chassis.

For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 5.2.4 Test results



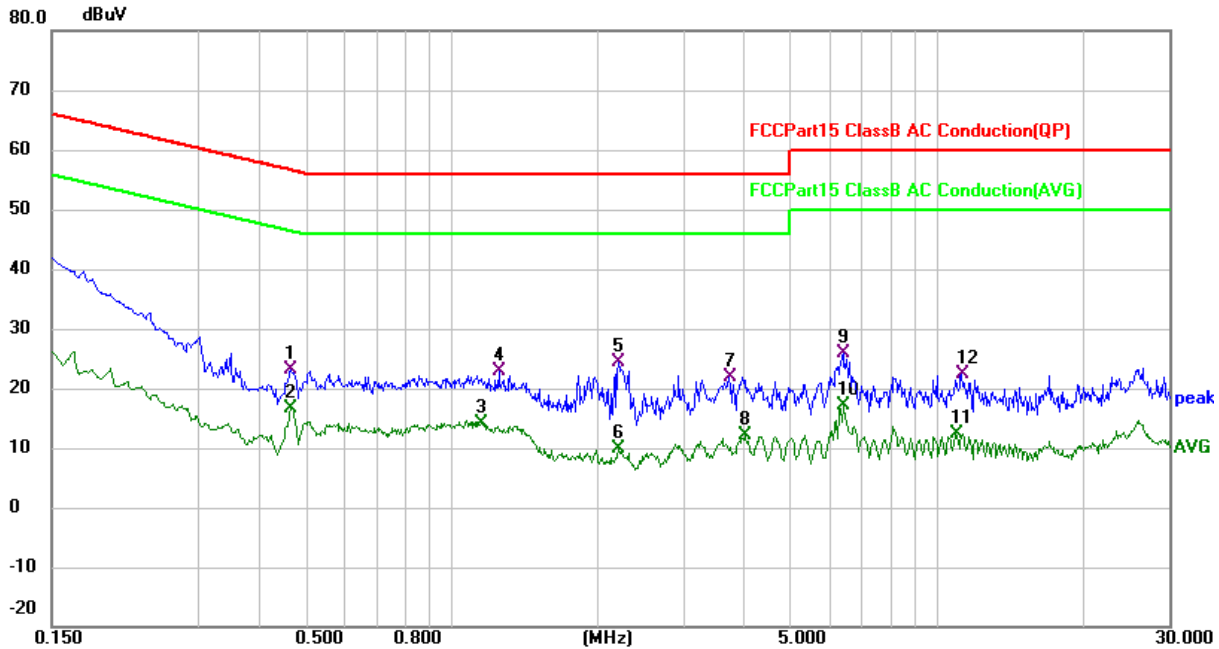
EUT:	Microphone	Model Name :	BY-X1 RX
Pressure:	101kPa	Polarization:	N
Test voltage:	Power by adapter AC 120V/60Hz	Test mode:	Charging+TX 2405.377



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1620	18.68	10.99	29.67	55.36	-25.69	AVG
2	*	0.1700	32.23	10.98	43.21	64.96	-21.75	QP
3		0.4780	13.11	11.04	24.15	56.37	-32.22	QP
4		0.4820	7.04	11.06	18.10	46.30	-28.20	AVG
5		2.2220	8.46	15.86	24.32	56.00	-31.68	QP
6		2.2220	-6.96	15.86	8.90	46.00	-37.10	AVG
7		3.2620	10.81	11.40	22.21	56.00	-33.79	QP
8		3.6020	-0.28	11.42	11.14	46.00	-34.86	AVG
9		6.3060	13.81	11.56	25.37	60.00	-34.63	QP
10		6.3060	5.17	11.56	16.73	50.00	-33.27	AVG
11		26.2380	2.46	11.76	14.22	50.00	-35.78	AVG
12		26.3180	12.09	11.76	23.85	60.00	-36.15	QP



EUT:	Microphone	Model Name :	BY-X1 RX
Pressure:	101kPa	Polarization:	L
Test voltage:	Power by adapter AC 120V/60Hz	Test mode:	Charging+TX 2405.377



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.4660	12.16	10.89	23.05	56.58	-33.53	QP
2	*	0.4660	5.66	10.89	16.55	46.58	-30.03	AVG
3		1.1500	0.59	13.52	14.11	46.00	-31.89	AVG
4		1.2540	9.07	13.75	22.82	56.00	-33.18	QP
5		2.2100	8.50	15.82	24.32	56.00	-31.68	QP
6		2.2100	-5.97	15.82	9.85	46.00	-36.15	AVG
7		3.7220	10.46	11.37	21.83	56.00	-34.17	QP
8		4.0220	0.69	11.38	12.07	46.00	-33.93	AVG
9		6.3900	14.56	11.39	25.95	60.00	-34.05	QP
10		6.3900	5.86	11.39	17.25	50.00	-32.75	AVG
11		10.9540	0.83	11.58	12.41	50.00	-37.59	AVG
12		11.2540	10.86	11.59	22.45	60.00	-37.55	QP

### 5.3 Radiated spurious emission

#### 5.3.1 Limit

FCC PART 15.249(a);

Except as provided in paragraph (a) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics ( $\mu\text{V/m}$ )
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

#### 5.3.2 Test method

- a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.
- b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- c) Use the following spectrum analyser settings:
  - 1) Span = wide enough to fully capture the emission being measured
  - 2) RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$
  - 3) VBW  $\geq$  RBW, Sweep = auto
  - 4) Detector function = peak
  - 5) Trace = max hold
- d) Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.



- e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

**5.3.3 Test Result**

Below 30MHz

EUT:	Microphone	Model name. :	BY-X1 RX
Pressure:	1010 hPa	Test voltage:	Power by adapter AC 120V/60Hz
Test mode:	Charging+TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	Pass
--	--	--	--	Pass

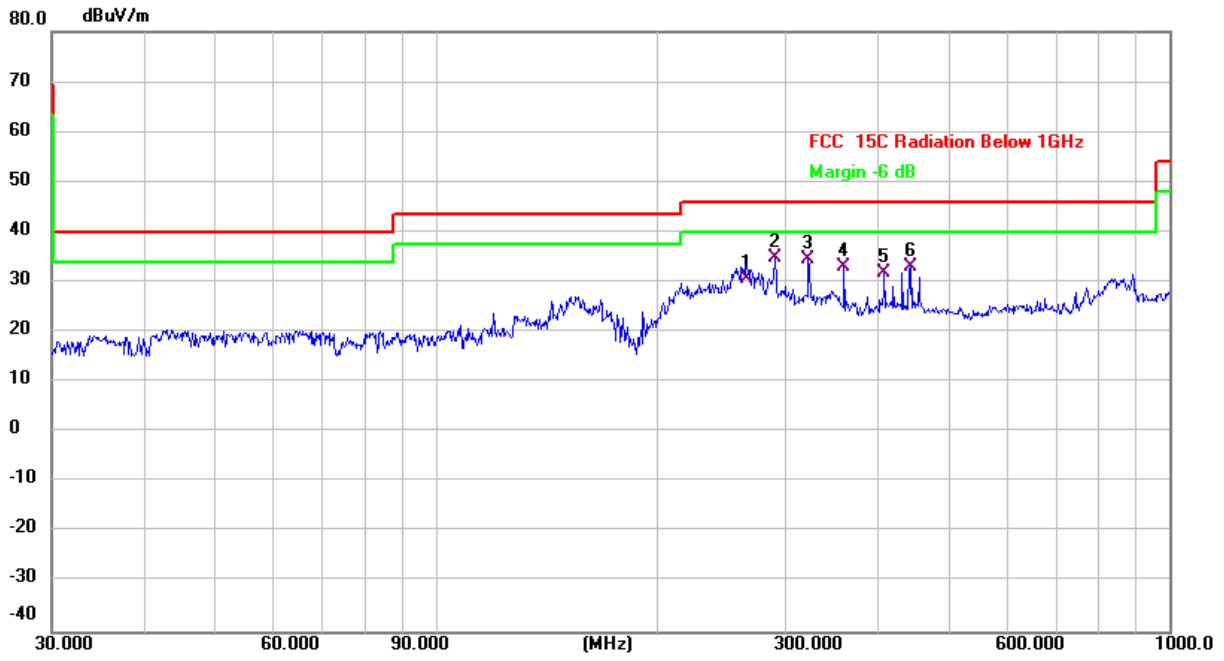
Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor =  $40 \log (\text{specific distance}/\text{test distance})(\text{dB})$ ;
3. Limit line = specific limits (dBuV) + distance extrapolation factor.



30MHz-1GHz

EUT:	Microphone	Model Name:	BY-X1 RX
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	Power by adapter AC 120V/60Hz	Test Mode:	TX-2405.377MHz

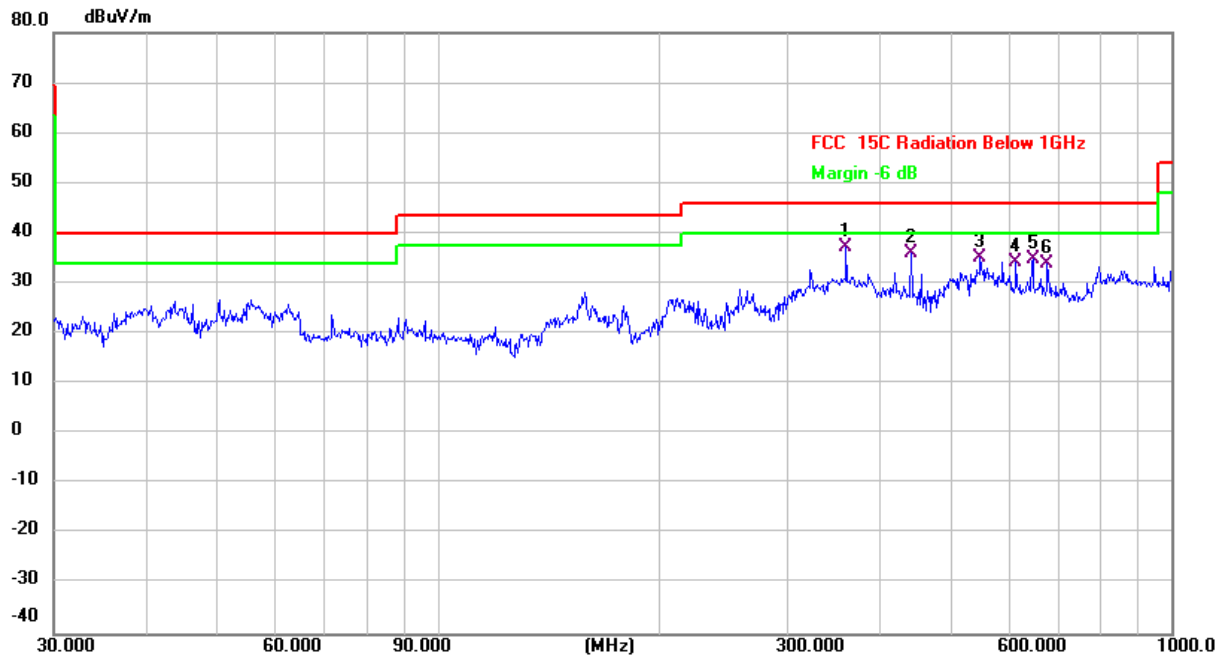


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		265.6757	36.40	-5.70	30.70	46.00	-15.30	QP
2	*	290.0172	40.51	-5.78	34.73	46.00	-11.27	QP
3		322.1884	39.22	-4.67	34.55	46.00	-11.45	QP
4		360.4476	37.74	-4.58	33.16	46.00	-12.84	QP
5		408.9458	35.87	-3.98	31.89	46.00	-14.11	QP
6		444.8514	36.55	-3.45	33.10	46.00	-12.90	QP





EUT:	Microphone	Model Name:	BY-X1 RX
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	Power by adapter AC 120V/60Hz	Test Mode:	TX-2405.377MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	360.4476	41.88	-4.58	37.30	46.00	-8.70	QP
2		441.7425	39.41	-3.41	36.00	46.00	-10.00	QP
3		549.0193	36.61	-1.35	35.26	46.00	-10.74	QP
4		614.2142	34.29	0.00	34.29	46.00	-11.71	QP
5		647.3854	35.08	-0.28	34.80	46.00	-11.20	QP
6		677.5797	34.22	-0.24	33.98	46.00	-12.02	QP

Note:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. The three modulated high, medium and low channels have been tested. The report only shows the worst mode. The worst mode is CH1.



1GHz-26.5GHz:

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
<b>GFSK - 2405.377 MHz TX mode</b>							
4810	49.56	1.53	51.09	74	-22.91	Peak	V
4810	39.77	1.53	41.3	54	-12.7	AVG	V
7216	40.67	5.46	46.13	74	-27.87	Peak	V
7216	30.81	5.46	36.27	54	-17.73	AVG	V
9621	42.93	6.34	49.27	74	-24.73	Peak	V
9621	33.08	6.34	39.42	54	-14.58	AVG	V
4810	50.25	1.53	51.78	74	-22.22	Peak	H
4810	38.51	1.53	40.04	54	-13.96	AVG	H
7216	41.07	5.46	46.53	74	-27.47	Peak	H
7216	30.31	5.46	35.77	54	-18.23	AVG	H
9621	42.03	6.34	48.37	74	-25.63	Peak	H
9621	30.72	6.34	37.06	54	-16.94	AVG	H
<b>GFSK - 2438.657 MHz TX mode</b>							
4877	50.52	1.67	52.19	74	-21.81	Peak	V
4877	46.35	1.67	48.02	54	-5.98	AVG	V
7315	42.39	5.45	47.84	74	-26.16	Peak	V
7315	31.88	5.45	37.33	54	-16.67	AVG	V
9754	42.06	6.37	48.43	74	-25.57	Peak	V
9754	32.22	6.37	38.59	54	-15.41	AVG	V
4877	49.99	1.67	51.66	74	-22.34	Peak	H
4877	44.77	1.67	46.44	54	-7.56	AVG	H
7315	42.36	5.45	47.81	74	-26.19	Peak	H
7315	32.32	5.45	37.77	54	-16.23	AVG	H
9754	42.15	6.37	48.52	74	-25.48	Peak	H
9754	30.99	6.37	37.36	54	-16.64	AVG	H



Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
<b>GFSK - 2475.521 MHz TX mode</b>							
4951	53.75	1.82	55.57	74	-18.43	Peak	V
4951	46.25	5.4	51.65	54	-2.35	AVG	V
7426	43.53	5.43	48.96	74	-25.04	Peak	V
7426	32.11	5.43	37.54	54	-16.46	AVG	V
9902	41.49	6.41	47.9	74	-26.1	Peak	V
9902	31.68	6.41	38.09	54	-15.91	AVG	V
4951	53.59	1.82	55.41	74	-18.59	Peak	H
4951	49.9	1.82	51.72	54	-2.28	AVG	H
7426	45.46	5.43	50.89	74	-23.11	Peak	H
7426	33.19	5.43	38.62	54	-15.38	AVG	H
9902	42.13	6.41	48.54	74	-25.46	Peak	H
9902	30.36	6.41	36.77	54	-17.23	AVG	H

Note:

1. All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
2. Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
3. All the modulation modes have been tested, and the worst results are reflected in the report.



**5.3.4 Band edge–Field strength of fundamental**

Frequency (MHz)	Ant. Polarization H / V	Emission level dB $\mu$ V/m	Limits dB $\mu$ V/m	Detector	Result
2405.377	H	78.64	114		
2405.377	H	78.40	94	AV	PASS
2405.377	V	73.90	114	PK	PASS
2405.377	V	73.83	94	AV	PASS

Frequency (MHz)	Ant. Polarization H / V	Emission level dB $\mu$ V/m	Limits dB $\mu$ V/m	Detector	Result
2438.657	H	78.60	114		
2438.657	H	78.23	94	AV	PASS
2438.657	V	74.51	114	PK	PASS
2438.657	V	74.47	94	AV	PASS

Frequency (MHz)	Ant. Polarization H / V	Emission level dB $\mu$ V/m	Limits dB $\mu$ V/m	Detector	Result
2475.521	H	78.71	114		
2475.521	H	78.41	94	AV	PASS
2475.521	V	77.10	114	PK	PASS
2475.521	V	76.93	94	AV	PASS



**5.3.5 Band edge-radiated**

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
<b>GFSK – Low band-edge</b>							
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
2310	50.35	-6.6	43.75	74	-30.25	Peak	V
2310	40.62	-6.6	34.02	54	-19.98	AVG	V
2390	48.59	-6.23	42.36	74	-31.64	Peak	V
2390	39.22	-6.23	32.99	54	-21.01	AVG	V
2400	55.13	-6.36	48.77	74	-25.23	Peak	V
2400	46.13	-6.36	39.77	54	-14.23	AVG	V
2310	50.76	-6.6	44.16	74	-29.84	Peak	H
2310	40.23	-6.6	33.63	54	-20.37	AVG	H
2390	49.97	-6.23	43.74	74	-30.26	Peak	H
2390	39.9	-6.23	33.67	54	-20.33	AVG	H
2400	56.17	-6.36	49.81	74	-24.19	Peak	H
2400	46.99	-6.36	40.63	54	-13.37	AVG	H
<b>GFSK – High band-edge</b>							
2483.5	52.34	-5.79	46.55	74	-27.45	Peak	V
2483.5	34.67	-5.79	28.88	54	-25.12	AVG	V
2500	48.78	-5.72	43.06	74	-30.94	Peak	V
2500	34.48	-5.72	28.76	54	-25.24	AVG	V
2483.5	50.97	-5.79	45.18	74	-28.82	Peak	H
2483.5	40.54	-5.79	34.75	54	-19.25	AVG	H
2500	49.44	-5.72	43.72	74	-30.28	Peak	H
2500	39.7	-5.72	33.98	54	-20.02	AVG	H

## 5.4 20dB and 99% bandwidth

### 5.4.1 Limits

FCC §15.215(c)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 5.4.2 Test method

Use the following spectrum analyzer settings:

#### For 20 dB bandwidth

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW  $\geq$ 1% of the 20 dB bandwidth

VBW  $\geq$ RBW

Sweep = auto

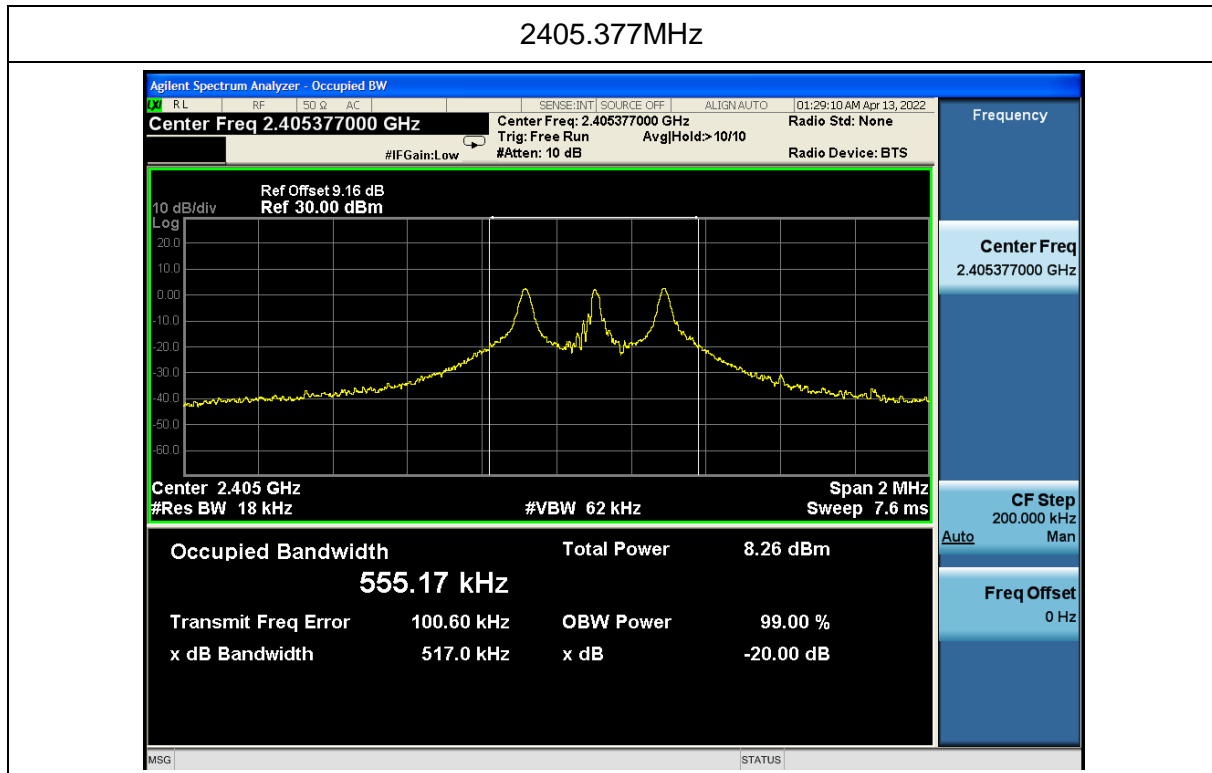
Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth and 99% occupied bandwidth of the emission

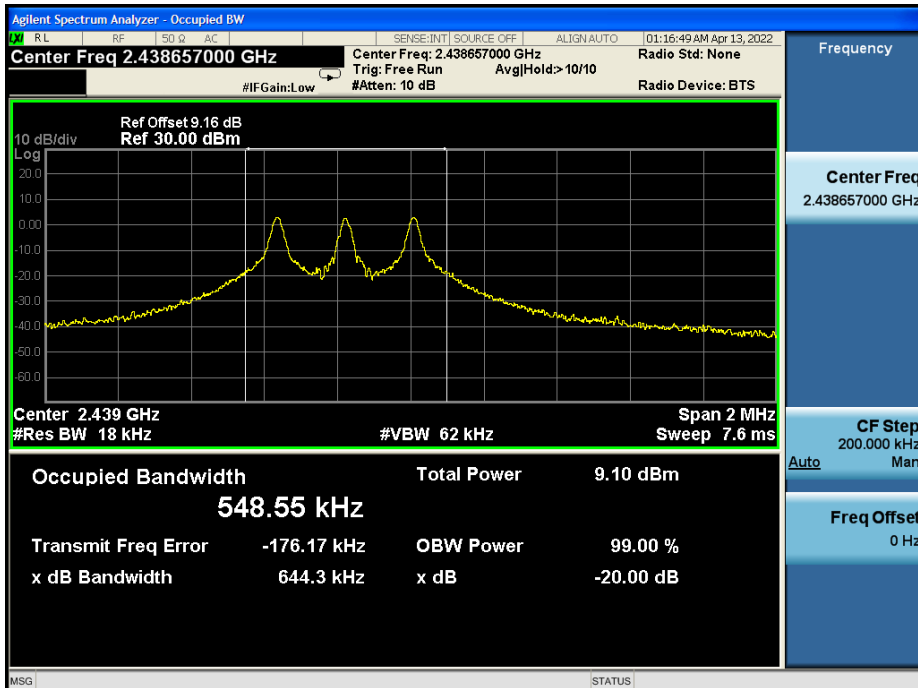
**5.4.3 Test result**

Frequency (MHz)	20dB bandwidth (MHz)	99% bandwidth (MHz)
2405.377	0.517	0.55517
2438.657	0.6443	0.54855
2475.521	0.5245	0.55341

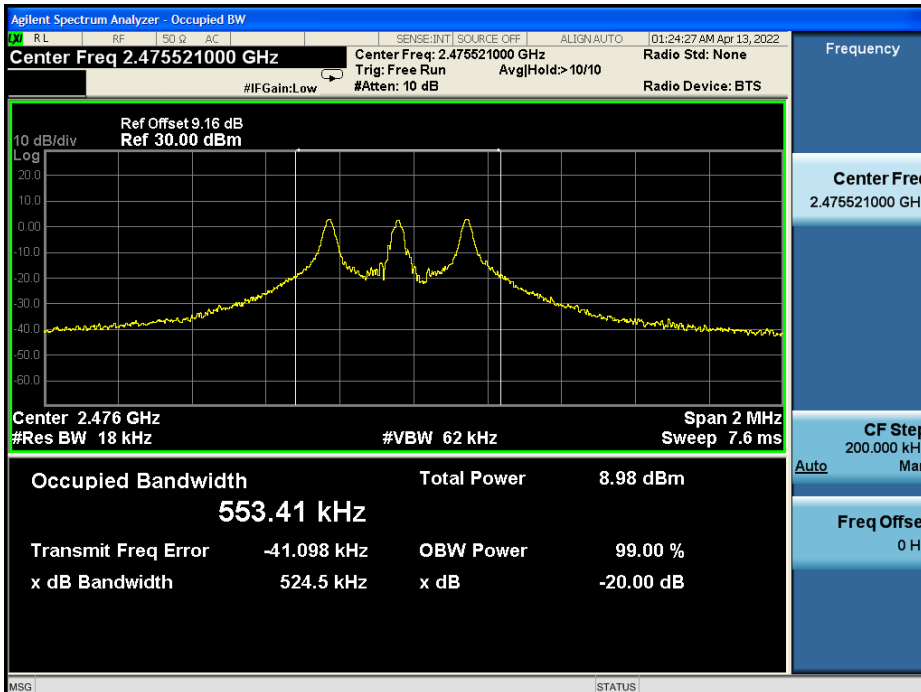
Test plots




2438.657MHz



2475.521MHz







## **Photographs of the Test Setup**

See the APPENDIX – Test setup photos.



## **Photographs of the EUT**

See the APPENDIX 1- EUT PHOTO.

**----END OF REPORT----**